

THE REDISCOVERY OF THE SOUTH AMERICAN
HYBANTHUS PARVIFLORUS (VIOLACEAE)
IN NORTH AMERICA

B. Eugene Wofford

Dept. of Botany
The University of Tennessee
Knoxville, Tennessee 37996, U.S.A.

Alan S. Weakley

University of North Carolina Herbarium (NCU)
North Carolina Botanical Garden
Campus Box #3280, University of North Carolina
Chapel Hill, North Carolina 27599-3280, U.S.A.
weakley@unc.edu

Juliana de Paula-Souza

Universidade de São Paulo-Herbário ESA
Av. Pádua Dias 11, C.P. 09
13418-900 Piracicaba-São Paulo-BRASIL
jupsouza@esalq.usp.br

Thomas E. Govus

3711 Big Creek Road
Ellijay, Georgia 30536, U.S.A.

ABSTRACT

An unknown plant collected in 1998 at Fort Pulaski, Chatham County, Georgia has been identified as *Hybanthus parviflorus* (Violaceae), a South American native. The Georgia collection represents only the third report of this species in North America, and the first since the 1880s, when it was collected on ship's ballast at two port cities in New Jersey. It is possible that the introduction of the species to Georgia was also via ship's ballast, as Fort Pulaski would have been a port of call for ships going to and from Savannah, a major seaport in the 18th and 19th centuries; if the Georgia plant was introduced on ballast, it is apparently established. It is also possible that it is a more recent introduction; if so, however, the means of introduction of this species is obscure, as it is not typically an agricultural weed, nor of horticultural interest. The use of digital imagery and electronic mail facilitated the rapid and accurate identification of this alien species, which should now be considered an established, though rare, component of the North American flora.

RESUMEN

Una planta desconocida colectada en 1998 en Fort Pulaski, Chatham County, Georgia ha sido identificada como *Hybanthus parviflorus* (Violaceae), nativa de Sur América. La colección de Georgia es la tercera cita de esta especie en Norte América, y la primera desde los 1880s, cuando fue colectada en lastre de barcos en dos ciudades portuarias de New Jersey. Es posible que la introducción de la especie en Georgia haya sido también mediante lastre de barco, ya que Fort Pulaski podría haber sido un Puerto de llamada para barcos que van o regresan de Savannah, un gran puerto en los siglos XVIII y XIX; si la planta de Georgia fue introducida en el lastre, está aparentemente establecida. Es también posible que sea una introducción más reciente; en este caso, sin embargo, el sistema de introducción de esta especie no está claro, ya que típicamente no es una mala hierba agrícola, ni de interés horticola. El uso de imágenes digitales y correo electrónico facilitó la identificación rápida y precisa de esta especie invasora, que podría ahora ser considerada como un componente establecido, aunque raro, de la flora de Norte América.

The University of Tennessee Herbarium (TENN) recently received a loan of selected *Gratiola* (Scrophulariaceae) from the University of Georgia Herbarium

(GA). Included within the loan were a few unidentified specimens of either unrequested *Gratiola* or the closely related *Lindernia*, and an undetermined specimen (Figs. 1, 2) collected by Govus (1998) from Ft. Pulaski National Monument, Chatham Co., Georgia, as part of a catalog of the vascular flora of that U.S. National Park Service unit (Govus 1998). At GA, this last specimen had been tentatively identified by an unknown individual as *Gratiola virginiana*, and then that identification had been crossed through, but the specimen was apparently left in a *Gratiola* folder and sent out with the *Gratiola* loan to TENN. Upon receipt of the loan at TENN, Wofford immediately eliminated this specimen as a member of Scrophulariaceae based on overall morphology. A few flowers were rehydrated and upon dissection its floral morphology unequivocally placed it in Violaceae, i.e., flowers zygomorphic, sepals 5, subequal, petals 5, unequal, the lower one slightly spurred at the base and wider than the others; stamens 5, the lower two provided with nectariferous appendages, the connective prolonged into a membranous appendage; ovary superior, unilocular, 3-valved, placentation parietal.

TENN houses only two genera of Violaceae (*Viola* and *Hybanthus*); this specimen obviously was not a *Viola* but the flowers were strikingly similar to the common eastern North American *Hybanthus concolor* (T.F. Forst.) Spreng. and the southwestern North American *H. verticillatus* (Ortega) Baill. Wofford developed the hypothesis that this might be an introduction of an extracontinental species of *Hybanthus*, a pantropical genus (extending into warm temperate areas, as in eastern North America) of about 85 species (Ballard, in press), though sometimes credited with as many as 150 species (Mabberley 1997). Additional specimens from Mexico and Cuba available at TENN were examined, but none remotely fit the overall morphology of this specimen.

Digital images of the unknown plant were then sent to Weakley at the University of North Carolina Herbarium (NCU). Two NCU specimens of *Hybanthus* (from Paraguay and Argentina) closely resembled the unknown from Georgia; unfortunately, both specimens were labeled only "*Hybanthus*" and lacked an identification to the species level.

Finally, an electronic image of the Georgia specimen was sent to Paula-Souza, who has research interests in Violaceae, especially *Hybanthus*. She immediately responded that "this plant is *Hybanthus parviflorus* (Mutis ex L.f.) Baill. This is a very common plant here in South America, and although it is considered a weed in some places, I have never seen a record of it from the United States."

Further investigation revealed that *H. parviflorus* had indeed been reported previously from North America, by Dowell (1906), as *Calceolaria glutinosa* (Vent.) Kuntze, based on several specimens collected "on ballast at Communipaw Ferry," New Jersey, in July and September 1880 (see specimens cited below). *H. parviflorus* is additionally represented by a specimen at the Academy of Natural Sciences in Philadelphia (PH), identified as *Ionidium glutinosum* Vent.



FIG. 1. Image of Govus collection of *Hybanthus parviflorus* from Fort Pulaski, Georgia. Photograph by Gene Wofford.



FIG. 2. Closeup of portion of Govus collection of *Hybanthus parviflorus* from Fort Pulaski, Georgia. Photograph by Gene Wofford.

and labeled "Herbarium of Isaac Burk, Philadelphia; Pa., on ballast, Kaigns Pt., N.J., October 1885." However, catalogs of the flora of New Jersey (Britton 1889), and the various manuals covering the Northeastern United States (Fernald 1950; Gleason 1952; Gleason & Cronquist 1991) do not include this taxon, presumably considering it a ballast waif, and it is also not included in the recent check-list of the Flora of North America (Kartesz 1999).

Hybanthus parviflorus is widely distributed over South America, from Venezuela through southern Brazil (Figs. 3, 4), Chile, and Argentina, occurring preferentially in cold regions and at higher altitude places in warmer regions. The species is commonly found in open sites, frequently behaving as a weed in pas-

tures and roadsides, though not as a weed of cultivated crops. The 1880 New Jersey specimens came from ship's ballast, at the ferry landing of the Communipaw Ferry, one of several busy ferries between Jersey City and New York City. The 1885 specimen also came from ballast, at Kaighn's Point on the Delaware River in Camden, also a busy ferry landing serving Camden, New Jersey and Philadelphia, Pennsylvania, in operation from 1806 until at least 1926. It seems plausible that *H. parviflorus* was introduced to Fort Pulaski, Georgia, via ballast as well. Fort Pulaski has been actively used by ships since at least the mid 1700s, and would have been a regular docking area for sailing ships through much of the late 18th and early 19th centuries, including use by ships going to and from the large and active port city of Savannah, Georgia (ca. 20 miles away) to destinations around the world. If *H. parviflorus* were introduced to Georgia on ballast, it is apparently established, as the 1998 collection is long after the use of solid ballast material was discontinued. It is also possible that this represents a more recent introduction, but how and why this species would have arrived at Fort Pulaski is obscure, as the species is neither typically a weed of agricultural crops nor an object of horticultural interest.

Given this more recent occurrence of *H. parviflorus*, found 118 years after its initial collection in North America, it appears that *H. parviflorus* should be considered a rare, alien component of the North American flora, and collectors should be aware of its potential occurrence, especially in the vicinity of old seaports. It does not appear, at least at this time, that it is likely to be an aggres-



FIG. 3. Habit of *Hybanthus parviflorus*. Photograph by Juliana de Paula-Souza, from live material in Itararé, São Paulo, Brazil.



FIG. 4. Detail of flower of *Hybanthus parviflorus*. Photograph by Juliana de Paula-Souza from live material in Itararé, São Paulo, Brazil.

sive alien weed. Below, we present a description to aid in its recognition, should it occur elsewhere in North America. We also note that the increased use of digital imagery and electronic mail in herbarium work greatly facilitates international collaboration and the identification of an unknown, extracontinental, and potentially invasive species; "virtual annotation" can provide rapid results without the expense and risk of loaning uniquely valuable specimens.

Hybanthus parviflorus (Mutis ex L.f.) Baill., Bot. Med. 2:841. 1884.

Herbs up to 30 cm high, branched, erect or suberect, internodes (1.7-)4-20 mm long; leaves alternate or opposite, frequently opposite only at the base of the branches, petiole ca. 0.5-4 mm long, blade (3.5-)6-30 mm long \times 2-10(-15) mm wide, elliptic, lanceolate or oblong, less frequently oblanceolate, widely elliptic, ovate or obovate, acute to obtuse at apex, margin serrate, base acute, attenuate, rounded or obtuse, glabrous to pubescent or puberulent on the midrib; stipules narrowly lanceolate; flowers white, frequently with purplish lines on

the anterior petal, solitary, axillary or arranged in poorly defined racemose inflorescences; floral pedicel 3–11(–24) mm long, bracteoles absent; sepals equal or subequal, ca. 1–1.7 mm long \times ca. 0.5 mm wide, narrowly lanceolate or rarely ovate to suborbicular, subfalcate, acuminate or rarely round or obtuse at apex, margin entire; posterior petals ca. 1 mm wide \times ca. 0.5 mm long, oblong, lateral petals ca. 1.5–1.8 mm long \times ca. 0.7 mm wide, oblong to lanceolate, falcate, anterior petal (1.5–)3–3.7 mm long \times 1.2–1.4 mm wide, clawed; stamens subsessile, anthers ca. 0.5 mm long, connective appendages orange–brown, ca. 0.3 mm long, frequently asymmetric, anterior stamens provided with noduliform nectariferous appendages; style 0.6–0.8 mm long, straight or subsigmoid, ovary ca. 0.6 mm long, glabrous, capsule 3–4 mm long \times 3.5 mm wide, ovoid to globose, seeds ca. 1.5 mm long \times ca. 1–1.2 mm wide.

Voucher specimens: **GEORGIA. Chatham Co.:** growing in grassy area along road near the picnic area, south central Cockspur Island, 7 Apr 1998, *Govus* 946 (GA!). **NEW JERSEY. Camden Co.:** on ballast, Kaigns Pt., N. J., Oct 1885, *Isaac Burk s.n.* (PH!). **Hudson Co.:** ballast, near Communipaw Ferry, N.J., Sep 1880, *Addison Brown s.n.* (GH!, NY!, US); Communipaw, N.J. (ballast), 20 Jul 1880, *Jos. Schrenk s.n.* (NY!).

ACKNOWLEDGMENTS

We thank the curators of GA, GH, NY, PH, and US for access to collections. We thank Harvey Ballard for pointing out the existence of the 1885 PH collection, and Harvey Ballard and Julie Ballenger for helpful reviews of the manuscript.

REFERENCES

- BALLARD, H.E., JR. [submitted] *Violaceae*. In: Kubitzki, K., ed. Families and genera of vascular plants. Institut für Allgemeine Botanik, Hamburg, Germany.
- BRITTON, N.L. 1889. Catalogue of plants found in New Jersey. Final Report of the State Geologist, vol. II, Trenton, N.J.
- DOWELL, P. 1906. North American species of *Calceolaria*. Bull. Torrey Bot. Club 33:547–556.
- FERNALD, M.L. 1950. Gray's manual of botany, eighth (centennial) edition. D. Van Nostrand Co., New York, N.Y.
- GLEASON, H.A. 1952. The new Britton and Brown illustrated flora of the northeastern United States and adjacent Canada. New York Botanical Garden, Bronx, NY.
- GLEASON, H.A. and A. CRONQUIST. 1991. Manual of vascular plants of northeastern United States and adjacent Canada, second edition. New York Botanical Garden, Bronx.
- GOWUS, T.E. 1998. Fort Pulaski National Monument inventory final report, Part A: Vascular plants. National Park Service, Southeast Region, Atlanta, GA.
- KARTESZ, J.T. 1999. A synonymized checklist and atlas with biological attributes for the vascular flora of the United States, Canada, and Greenland. First Edition. In: Kartesz, J.T., and C.A. Meacham. Synthesis of the North American flora, Version 1.0. North Carolina Botanical Garden, Chapel Hill.
- MABBERLEY, D.J. 1997. The plant-book: a portable dictionary of the vascular plants. Second edition. Cambridge Univ. Press, Cambridge, England.